The New Hampshire Climate Change Policy Task Force

New Hampshire Climate Action Plan

A Plan for New Hampshire's Energy, Environmental and Economic Development Future

Appendix 4.3: Support Regional and National Actions to Reduce Greenhouse Gas Emissions

Prepared by the
NH Department of Environmental Services
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Recommended Actions

Actions recommended by the Task Force:

TLU Action 1.A.1 – Support Stricter Corporate Average Fuel Economy Standards

Summary

New Hampshire should support more stringent, near-term Corporate Average Fuel Economy (CAFE) standards for passenger vehicles and inclusion of heavier passenger vehicles up to 10,000 lbs gross vehicle weight rating (GVWR) in the standards. The latter vehicle class includes large sport utility vehicles (SUVs) and pick up trucks. In addition, the state should support the adoption of CAFE standards for vehicles greater than 10,000 GVWR in the near future. CAFE is the sales-weighted average fuel economy, expressed in miles per gallon (mpg), of a manufacturer's fleet of light-duty vehicles and light-duty trucks. It currently applies to vehicles with a GVWR of 8,500 lbs. or less, manufactured for sale in the United States, for any given model year. New standards recently proposed by the National Highway Traffic Safety Administration (NHTSA)[1] would require that the combined car and light truck fleet meet a 35-mpg average by 2020 (up from the current standards of 27.5 mpg for light cars and 22.2 mpg for light trucks, which were set in 1984). Existing analyses indicate that higher fuel economy is achievable with currently available technology and that significant improvements could be made by 2015.

Program Description

1. Mechanism (*i.e., how the policy or program achieves the desired result*): The Secretary of Transportation has delegated authority to establish CAFE standards to the Administrator of the National Highway Traffic Safety Administration (NHTSA). Congress specified that CAFE standards must be set at the "maximum feasible level" and provided that the Department's determinations of maximum feasible level be made in consideration of four factors:

    - Technological feasibility,
    - Economic practicability,
    - Effect of other standards on fuel economy, and
    - Need of the nation to conserve energy.

    The state, through NHDES, should work with regional and national air quality organizations supporting more stringent standards and aggressive phase-in of new standards, achieving significant fuel economy improvements by 2015. The state could also communicate to the New Hampshire Congressional delegation the benefits of more stringent fuel efficiency standards.

2. Implementation Plan (*i.e., how to implement the specific policy or program*):

    a. *Method of Establishment (e.g., legislation, executive order):* Support for more stringent standards could be done with minimal action required. Additional weight to the issue could be provided by legislative action that would encourage and direct the New Hampshire Congressional Delegation to support more stringent standards

    b. *Resources Required:* Existing state staff

    c. *Barriers to Address (especially for medium to low feasibility actions):* Significant resistance from auto manufacturers would make difficult the political actions needed to implement more stringent CAFE standards. Higher standards do not have to be based on *existing* technology, but must be based on reasonable assumptions that the necessary technology could be developed adequately to allow manufacturers to meet the standard. Public education and outreach is needed to drive demand to more fuel efficient vehicles. Loopholes within existing CAFE standards that reduce the rule effectiveness must be closed.

3. Parties Affected by Implementation (*i.e., residents, businesses, municipalities, etc.*):

[1] http://www.nhtsa.dot.gov/CARS/rules/CAFE/overview.htm

a. *Parties Responsible for Implementation:* NHDES, Federal gov't (NHTSA), auto manufacturers

b. *Parties Paying for Implementation:* Vehicle manufacturers and vehicle purchasers

c. *Parties Benefiting from Implementation:* Vehicle purchasers who will have lower fuel costs, companies that provide the technology and equipment to meet the standards.

4. Related Existing Policies and Programs (*i.e., those that address similar issues without interacting*):

- Granite State Clean Cities Coalition, promoting the use of alternative fuel and advanced technology vehicles;
- Granite State Clean Cars, a voluntary program in which auto dealerships clearly identify vehicles that meet low emission vehicle standards and achieve 30 mpg or greater.

5. Complementary Policies (*i.e., those that achieve greater reductions through parallel implementation*):

a. *Existing:*

b. *Proposed*: TLU Action 1.A.3 – Adopt California Low Emission Vehicle (CALEV) Standards
TLU Action 1.C.2 – Promote Advanced Technology Vehicles and Supporting Infrastructure

6. Timeframe for Implementation: Immediate efforts are needed. Changes to CAFE standards must allow manufacturers three years to meet the standards after their adoption. NHSTA is required to review the existing standards periodically. As new technology is developed, the standards should be revised to become increasingly stringent.

7. Anticipated Timeframe of Outcome: 10 to 15 years, depending on the level of increase and date by which increases become effective. The NH vehicle fleet turns over (new vehicles replace older ones) about once every 8 years. If new standards were aggressively phased in (within 3 years), the state would realize significant results within 11 years, increasing in future years.

Program Evaluation

1. Estimated CO_2 Emission Reductions:

Timeframe	**Annual CO_2 Emission Reductions ($MMTCO_2e$) at Different CAFE Standards**			
	@35 mpg	**@40 mpg**	**@45 mpg**	**@50 mpg**
Short-term (2012)	0.09	0.15	0.21	0.27
Mid-term (2025)	1.13	1.64	2.04	2.37
Long-term (2050)	1.85	2.64	3.25	3.75

2. Economic Effects:

a. Costs:

i. Implementation Cost: Moderately high ($125-$500 million) for all scenarios
ii. Timing: Constant / even for all scenarios
iii. Impacts: Consumer for all scenarios

b. Savings:

i. Potential Economic Benefit:

CAFE Standard	Relative Savings
35 mpg	High ($500 million - $1 billion)
40 mpg	High ($500 million - $1 billion)
45 mpg	Very High (Greater than $1 billion)
50 mpg	Very High (Greater than $1 billion)

ii. Timing: Low short-term / mostly long-term for all scenarios
iii. Impacts: Consumer – evenly distributed for all scenarios

3. Other Benefits/Impacts:

   a. *Environmental*: This would reduce emissions of carbon dioxide, greenhouse gases, and other primary air pollutants in order to mitigate the effects of climate change and pollution of our ecosystems. This would lead to improved air and water quality directly as well as have more indirect effects on the fish and wildlife and the ecosystems upon which they depend.

   a. *Health:* Human health benefits will be realized by decreasing exposure to toxic and hazardous pollutants, many of which may have an effect that is exacerbated by the increase in hot summer days. Avoiding the impacts of air pollution can reduce the incidence of cardiac and respiratory disease.

   b. *Social*: This will reduce the countries dependence on oil and therefore ability to be manipulated by foreign countries

   c. *Other*: A significant amount of US dollars would be retained in the US economy rather then being sent abroad to oil producing countries.

4. Potential for Implementation (*i.e., including challenges, obstacles and opportunities*):

   d. *Technical*: Technology currently exists to achieve an average increase of about 10 to 12 mpg. Social acceptance of smaller vehicles will make this goal technically easy to achieve.

   e. *Economic*: Short term additional cost to consumer with long term significant savings. Also supports new technology industries.

   f. *Statutory/Regulatory*: Moderate hurdle to have more stringent standards adopted by the federal government.

   g. *Social*: Strong societal support for reducing vehicle fuel costs which this will, in effect, achieve.

5. Other Factors of Note: Actions supporting more stringent CAFE standards are already undertaken by NH DES.

6. Level of Group Interest: Moderate. This action can be implemented only at the federal level; it is not a program that New Hampshire can implement itself, like TLU Action 1.A.3 (CALEV). Therefore, the working group considered this a supporting action to undertake in the near-term (i.e., supports other actions and/or achieves moderate reductions but not considered "essential" to achieve substantial CO_2 reductions from the transportation and land use sector)

7. References:

TLU Action 1.A.2 – Support Fuel Economy Standards for Heavy-Duty Vehicles

Summary

New Hampshire should support establishment of fuel economy standards for all new vehicles greater than 8,500 pounds gross vehicle weight rating (GVWR) to achieve greater CO_2 reductions from future vehicles. The state should also support programs such as EPA's SmartWay Transport Partnership program to increase the fuel economy of existing heavy-duty vehicles. Tractor-trailers consume about two-thirds of all truck fuel and can be made more fuel-efficient through aerodynamic retrofits, low-rolling-resistance tires, and idling reduction technology. Heavy-duty vehicles are very durable, many having a useful life of 20 years or more in the U.S. before being sold in other countries. Improvements to the fuel economy of new trucks would have a significant impact within 10 to 20 years after implementation of tougher standards, but those standards are likely to be 10 or more years away from possible implementation. Using existing technology to improve the fuel economy of existing trucks would have an immediate impact. Action on future and existing trucks would provide both short- and long-term emission reductions.

Program Description

1. Mechanism (*i.e., how the policy or program achieves the desired result*):

   Fuel economy standards may be established only by the federal government. Therefore, the mechanism to implement more stringent fuel efficiency standards would be through the New Hampshire Congressional Delegation, with active support from state government for such a program.

   To improve the fuel economy of the existing vehicle fleet, New Hampshire could join with EPA in support of the SmartWay Transport Partnership. The state could develop financing options, such as small business environmental improvement loans, for vehicle owner-operators to purchase SmartWay Technology Packages.

2. Implementation Plan (*i.e., how to implement the specific policy or program*):
   a. *Method of Establishment (e.g., legislation, executive order):*
      - Fuel economy standards are established by the federal government. Support of this action by state government could be done through existing agencies and support from NH's congressional delegation.
      - An EPA partnership/financing program would require legislative action.
   b. *Resources Required:*
      - Existing state staff could assist in providing support of more stringent fuel economy standards.
      - New Hampshire would need to identify the appropriate state agency to administer a partnership/financing program, identify a funding source, and provide staff to administer the loan program and coordinate with EPA.
   c. *Barriers to Address (especially for medium to low feasibility actions):* Identification of a funding source and allocation of funds to establish a loan program.

3. Parties Affected by Implementation (*i.e., residents, businesses, municipalities, etc.*):
   a. *Parties Responsible for Implementation:* US Environmental Protection Agency, NH state government, fleet managers, and vehicle owner-operators.
   b. *Parties Paying for Implementation:* Companies that own fleets as well as vehicle owner-operators. Federal funds are also currently available.

c. *Parties Benefiting from Implementation:* Drivers, fleet managers, and vehicle owner-operators would see cost benefits, as would individuals and companies that rely on freight. Society as whole would benefit from improved air quality.

4. Related Existing Policies and Programs (*i.e., those that address similar issues without interacting*):
   - Corporate Average Fuel Economy Standards for vehicles <8501 GVWR
   - U.S. EPA SmartWay Transport Partnership

5. Complementary Policies (*i.e., those that achieve greater reductions through parallel implementation*):
   a. *Existing:*
   b. *Proposed:* TLU Action 1.A.1 – Support Stricter Corporate Average Fuel Economy Standards
      TLU Action 1.C.1 – Adopt a Low-Carbon Fuel Standard

6. Timeframe for Implementation:

Improvements to Existing Fleet:	Immediate
Federal Fuel Economy Standards:	10 to 15 years

7. Anticipated Timeframe of Outcome:

Improvements to Existing Fleet:	Immediate
Federal Fuel Economy Standards:	25 to 40 years

<u>Program Evaluation</u>

1. Estimated CO_2 Emission Reductions:
   a. Short-term (2012): 0.22 $MMTCO_2e$ /year
   b. Medium-term (2025): 0.94 $MMTCO_2e$ /year
   c. Long-term (2050): 1.82 $MMTCO_2e$ /year

2. Economic Effects:
   a. Costs:
      i. Implementation Cost: Moderately high ($125 million to $500 million)
      ii. Timing: Immediate / higher initial costs
      iii. Impacts: Business – evenly distributed
   b. Savings:
      i. Potential Economic Benefit: Moderate ($25 million to $125 million)
      ii. Timing: Constant / even
      iii. Impacts:

3. Other Benefits/Impacts:
   a. *Environmental*: This would reduce emissions of carbon dioxide, greenhouse gases, and other primary air pollutants in order to mitigate the effects of climate change and pollution of our ecosystems. This would lead to improved air and water quality directly as well as have more indirect effects on the fish and wildlife and the ecosystems upon which they depend.
   b. *Health:* Human health benefits will be realized by decreasing exposure to toxic and hazardous pollutants, many of which may have an effect that is exacerbated by the increase in hot summer days.

Avoiding the impacts of air pollution can reduce the incidence of cardiac and respiratory disease including a reduced incidence of the conditions that cause asthma and that can lead to asthma attacks as well as aggravate other cardiovascular and respiratory conditions.

c. *Social*: EPA states that the program contributes to environmental justice.

d. *Other*: By increasing energy efficiency we improve energy security by reducing dependence on foreign petroleum

4. Potential for Implementation (*i.e., including challenges, obstacles and opportunities*):

   a. *Technical*: Medium. The proposed action would involve establishing a loan program in state government.

   b. *Economic*: Medium. A funding source would be needed to establish a loan program, but federal funding might be available in coming years.

   c. *Statutory/Regulatory:* High. It is not anticipated that statutory or regulatory changes would be needed to implement this program

   d. *Social*: High. Cleaner-burning diesel trucks are supported by all sectors. Fuel savings would be strongly supported by the trucking industry.

5. Other Factors of Note:

6. Level of Group Interest: High. The working group considered this an essential action to undertake in the near-term to achieve significant reductions in CO_2 emissions from the transportation and land use sector.

7. References*:*

- *Key Resource*:
  Therese Langer, American Council for an Energy-Efficient Economy, February 11, 2004,
  http://www.bipartisanpolicy.org/files/news/finalReport/III.4.a%20-%20Heavy-Duty%20Trucks.pdf
- American Council for Energy Efficient Economy, Energy Savings Through Increased Fuel Economy for Heavy-Duty Trucks, (February 11, 2004).
- US EPA Smartways Home Page, http://www.epa.gov/smartway/index.htm.
- Cheryl Bynum, US EPA, SmartWay Transport Partnership, February 22, 2006 ,
  http://www.nescaum.org/documents/improving-the-fuel-economy-of-heavy-duty-fleets/cherylbynum-1.pdf/
- For average number of miles driven by age of truck:
  http://www1.eere.energy.gov/vehiclesandfuels/facts/2005/fcvt_fotw363.html.

TLU Action 1.C.1 – Adopt a Low-Carbon Fuel Standard

Summary

New Hampshire could reduce greenhouse gas (GHG) emissions by adopting a Low-Carbon Fuel Standard (LCFS). This mechanism would reduce emissions by ensuring that the mix of fuels sold in New Hampshire would meet, on average, a set standard for GHG emissions measured in CO_2 equivalent gram per unit of fuel energy sold. The standard would be measured on a lifecycle basis to account for all emissions from fuel consumption and production, including the "upstream" emissions that are major contributors to the global warming impact of transportation fuels.

Program Description

1. Mechanism (*i.e., how the policy or program achieves the desired result*):

   Fuel supply and distribution infrastructure limitations necessitate a regional approach to adoption of a LCFS. NHDES currently participates in LCFS working groups with both NESCAUM (Northeast States for Coordinated Air Use Management, which incorporates all New England states plus New York and New Jersey) and the NEG-ECP (Northeast Governors-Eastern Canadian Premiers). Governor Deval Patrick (MA) has recently invited all Northeast states to participate in a regional effort. A Northeast LCFS would need to identify lower-carbon fuel potentials for the region, including availability of biomass for regional production of advanced biofuels such as cellulosic ethanol and biodiesel. Other alternative vehicle fuels like natural gas and propane also offer lower carbon impacts than conventional petroleum fuels, despite their being fossil fuels themselves. Natural gas can be a very-low-carbon fuel when recovered from landfill operations, animal feed and waste facilities, and other non-traditional sources. Technological innovation would also be an important component of a successful LCFS, with increased use of battery electric vehicles charged by low-carbon energy (solar, wind, etc.) as a key strategy to meet such a standard.

   If implemented along the lines of California's program, the LCFS would utilize market-based mechanisms to allow providers to choose how they reduce emissions while responding to consumer demand. Providers could, for example, purchase and blend more low-carbon ethanol into gasoline products, purchase credits from electric utilities supplying low-carbon electrons to electric passenger vehicles, diversify into low-carbon hydrogen as a product, or choose new strategies yet to be developed.

   Determination of the carbon intensity of a given fuel would require a full lifecycle analysis, including secondary impacts such those as now being realized with corn-based ethanol, where fuel corn is competing with food crops for agricultural land and forcing new land to be cleared.

2. Implementation Plan (*i.e., how to implement the specific policy or program*):
   a. *Method of Establishment (e.g., legislation, executive order):* Work with Northeast states and eastern Canadian provinces to develop a regional standard, then have the standard adopted by each jurisdiction through appropriate legislation or by executive order.
   b. *Resources Required:* Staff to participate in regional planning and development rule language, then a program within DES or DOS to monitor and enforce compliance with the fuel standards.
   c. *Barriers to Address (especially for medium to low feasibility actions):* Political will to pass legislation; cost and availability of biofuels; cost and availability of electric vehicles, vehicle batteries, and other advance technologies.

3. Parties Affected by Implementation (*i.e., residents, businesses, municipalities, etc.*):
    a. *Parties Responsible for Implementation:* State Government, fuel providers, vehicle manufacturers
    b. *Parties Paying for Implementation:* Fuel companies and consumers
    c. *Parties Benefiting from Implementation:* Consumers and environment

4. Related Existing Policies and Programs (*i.e., those that address similar issues without interacting*): Granite State Clean Cities Coalition, encouraging the use of alternative fuel and advanced technology vehicles

5. Complementary Policies (*i.e., those that achieve greater reductions through parallel implementation*):
    a. *Existing:*
    b. *Proposed:* TLU Action 1.A.3 – Adopt California Vehicle Low-Emission Vehicle (CALEV) Standards
    TLU Action 1.C.2 – Promote Advanced Technology Vehicles and Supporting Infrastructure
    GLA Action 4.1.2 – Increase Use of Cleaner Fuels and Advanced Technologies

6. Timeframe for Implementation: Development of a LCFS for the region needs to begin now so that a standard would be available for adoption by the region in the next 3 to 5 years. Phase in of the standard would occur over the next 10 to 15 years, achieving a 10% reduction in about 2025.

7. Anticipated Timeframe of Outcome: 2025

<u>Program Evaluation</u>

1. Estimated CO_2 Emission Reductions:
    a. Short-term (2012): 0.00 $MMTCO_2e$ /year
    b. Medium-term (2025): 0.89 $MMTCO_2e$ /year
    c. Long-term (2050): 1.32 $MMTCO_2e$ /year

2. Economic Effects:
    a. Costs:
        i. Implementation Cost: Low (0-$2.5 million)
        ii. Timing: Immediate / higher initial cost
        iii. Impacts: State government
    b. Savings:
        i. Potential Economic Benefit: Moderate ($25 million to $125 million)
        ii. Timing: Constant / even
        iii. Impacts: Consumer – evenly distributed

3. Other Benefits/Impacts:
    a. *Environmental*: Many alternative fuels also lower emissions of ozone pre-cursors and particulate emissions, reducing harm to vegetation from ozone, and reducing regional haze issues. This would lead to improved air and water quality directly as well as have more indirect effects on the fish and wildlife and the ecosystems upon which they depend.
    b. *Health:* This would lead to reduced exposure to particulate matter, toxic air contaminants, and ground level ozone. Human health benefits will be realized by decreasing exposure to toxic and hazardous

pollutants, many of which may have an effect that is exacerbated by the increase in hot summer days. Avoiding the impacts of air pollution can reduce the incidence of cardiac and respiratory disease.

c. *Social*: Reduced dependence on foreign oil; regional economic development from new local fuels industry

d. *Other:*

4. Potential for Implementation (*i.e., including challenges, obstacles and opportunities*):

   a. *Technical*: Available vehicle technology (batteries/fuel cells/etc) is still developing, but standards such as this also help to drive such technology development by providing a guaranteed market. This standard would also drive development of advanced biofuels which currently exist, but are not yet being produced on a commercial scale.

   b. *Economic*: Will likely require incentives to start market development

   c. *Statutory/Regulatory*: Will require legislation to implement. Given level of support for climate change actions now this seems plausible

   d. *Social*: Very high. Broad public support given climate change awareness and recent oil company profits.

5. Other Factors of Note:

6. Level of Group Interest: High. The working group considered this an essential action to undertake in the early mid-term (2012) to achieve significant reductions in CO_2 emissions from the transportation and land use sector.

7. References:

- A Low Carbon Fuel Standard for California, Part 1: Technical Analysis and Part 2: Policy Analysis, August 1, 2007, http://www.energy.ca.gov/low_carbon_fuel_standard/
- http://www.travelmatters.org/calculator/transit/methodology

TLU Action 1.C.2 – Promote Advanced Technology Vehicles and Supporting Infrastructure

Summary

Promote development and deployment of alternative fuel vehicles, advanced technology vehicles, and associated fueling and powering infrastructure in order to speed market penetration of such vehicles and reduce transportation related greenhouse gas emissions. Alternative fuel vehicles (AFV), which will require adequate fueling infrastructure, include vehicles powered by fuels such as natural gas, propane, ethanol and biodiesel. Advanced technology vehicles, such as hybrid electric vehicles (HEV), plug-in hybrids (PHEV), advanced electric vehicles, and fuel cell vehicles (FCV), will require infrastructure in the form of electric plug-in ports, pricing and load signals from the grid. While these technologies promise dramatic reductions in GHG emissions associated with the transportation sector, planning will need to occur across sectors to ensure that reductions in transportation are not offset by increased emissions in other sectors.

Program Description

1. Mechanism (*i.e., how the policy or program achieves the desired result*):

   New Hampshire should promote the use of advanced technology and alternative fuel vehicles by helping to increase the availability and demand for these fuels and vehicles. This action is consistent with the state's objectives of reducing emissions from fossil fuels and our dependence on foreign oil. In response to rising petroleum prices, advanced technology vehicles would also provide users with lower-cost transportation fuel options. In this regard, the use of advanced technology and alternative fuel vehicles to reduce GHG emissions would be at least partially driven by market forces.

   Conventional HEVs combine conventional gas and diesel engines and braking systems with hybrid drive systems to create stored battery power that replaces fuel at lower speeds, thereby boosting mpg and reducing emissions. PHEVs are similar to HEV's but add a plug-in component to get much of their energy by connecting directly to the electric grid. FCVs are essentially electric vehicles that get their energy from on-board hydrogen fuel cells which power their electric motors. AFVs include dedicated natural gas, propane, electric, and other vehicles designed to run on a fuel other than gasoline or diesel.

   While these technologies promise dramatic reductions in GHG emissions associated with the transportation sector, planning will need to occur across sectors to ensure that reductions in transportation are not offset by increased emissions in other sectors. For example, rapid market penetration of plug-in hybrid vehicles could result in significant increases in peak load that draw from high emitting sources of electric generation. Advanced planning and grid integration could enable "Smart Grid" technology to charge these vehicles off-peak or even during times when intermittent renewable generation (e.g., wind power) is available.

2. Implementation Plan (*i.e., how to implement the specific policy or program*):

   a. *Method of Establishment (e.g., legislation, executive order):* The combination of increasing petroleum costs and greenhouse gas emission legislation may help to drive this development, but investment by federal and state government in research and development is needed, as is early adoption by state and federal fleets. Continued support for federal programs that provide funding for both technology development and deployment is critical.

   b. *Resources Required:*

      i. Resources include existing DES staff, for which funding is available through 2010. Funding is not guaranteed beyond that point, so additional funds could be required.

      ii. Utilities might need to make changes in domestic generation and distribution of electricity if there was widespread adoption of PHEVs resulting from additional demand on the grid. Lower non-peak rates would encourage recharging overnight when the existing utilities were under-

utilized. Infrastructure changes to provide plug in sources for PHEV's would be needed and would be relatively easy to implement. Development of alternative fuel infrastructure (natural gas/hydrogen/propane) is relatively expensive, but could be supported by large fuel users who would save in the long run because of lower fuel costs.

c. *Barriers to Address (especially for medium to low feasibility actions):* The cost of infrastructure development for alternative fuel vehicles is a significant barrier, but federal funding is available to help offset those costs. Hybrid and PHEV development is moving forward quickly and will likely be available by 2010 to 2012, though perhaps on a limited scale. Integration with the grid, such that plug-in vehicles are able to restrict battery charging, based on signals from the grid, to off-peak periods or to periods when renewable generation is more plentiful is not yet possible and may take several years to establish. FCV's are currently very expensive and hydrogen fuel is unavailable. Range of both FFVs and full electric vehicles must expand to reach broad public acceptance.

3. Parties Affected by Implementation (*i.e., residents, businesses, municipalities, etc*.):

   a. *Parties Responsible for Implementation:* Promotion of these vehicles would be done by both government and environmental groups. Automobile manufacturers are responsible for developing and marketing the vehicles. Fuel providers and utilities would be involved in developing the necessary fueling/charging infrastructure.

   b. *Parties Paying for Implementation:* Some of the promotional efforts can be covered by federal funding, but much will be the responsibility of state government. Ultimately the consumers will pay a higher cost for these vehicles, but it is anticipated those costs will be offset by fuel savings.

   c. *Parties Benefiting from Implementation:* Automobile manufacturers through unit sales. Consumers (both residential and commercial) by having lower cost transportation fuel options. With PHEV's, domestic generators of electricity and electric utilities with under utilized capacity or favorable market conditions.

4. Related Existing Policies and Programs (*i.e., those that address similar issues without interacting*): Granite State Clean Cities Coalition, promoting the use of advanced technology and alternative fuel vehicles.

5. Complementary Policies (*i.e., those that achieve greater reductions through parallel implementation*):

   a. *Existing:*

   b. *Proposed:*

      - EG 2.8 - Identify and Deploy Next Generation of Electric Grid Technologies
      - TLU Action 1.A.1 – Support Stricter Corporate Average Fuel Economy Standards
      - TLU Action 1.A.3 – Adopt California Low Emission Vehicle (CALEV) Standards
      - TLU Action 1.B.1 – Create a Point-of-Sale Financial Incentive for Higher-Efficiency Vehicles
      - TLU Action 1.C.1 – Adopt a Low Carbon Fuel Standard
      - GLA Action 4.1 – Revise State Vehicle Procurement Policy

6. Timeframe for Implementation: The Granite State Clean Cities program has been promoting these vehicles and fuels since 2002, with membership in the coalition growing each year. Continued efforts are needed to build demand for vehicles and fuels. PHEVs are expected to be on the market in 2010 to 2012. Continued escalation of petroleum pricing would help drive this market; but eventual consumer acceptance of higher prices or any downturn in prices would stall such growth, necessitating the continued involvement of government to provide incentives and influence the market. The FCV market is unknown and would have to compete with an ultra-competitive PHEV market.

7. Anticipated Timeframe of Outcome: 2010 through 2050

Program Evaluation

1. Estimated CO_2 Emission Reductions: This action not individually quantified.

2. Economic Effects:

    a. Costs:

        i. Implementation Cost: Moderately high ($125 million to $500 million)
        ii. Timing: Constant / even
        iii. Impacts: Consumer

    b. Savings:

        i. Potential Economic Benefit: Very high (Greater than $1 billion)
        ii. Timing: Low short-term / mostly long-term
        iii. Impacts: Consumer

3. Other Benefits/Impacts:

    a. *Environmental*: This action would reduce emissions of carbon dioxide, greenhouse gases, and other primary air pollutants in order to mitigate the effects of climate change and pollution of our ecosystems. This would lead to improved air and water quality directly as well as have more indirect effects on the fish and wildlife and the ecosystems upon which they depend.

    b. *Health:* Human health benefits will be realized by decreasing exposure to toxic and hazardous pollutants, many of which may have an effect that is exacerbated by the increase in hot summer days. Avoiding the impacts of air pollution can reduce the incidence of cardiac and respiratory disease.

    c. *Social* : Reduced reliance on foreign oil and continued use of the automobile for transportation.

    d. *Other*: Growth of nuclear energy in the domestic generating mix.

4. Potential for Implementation (*i.e., including challenges, obstacles and opportunities*):

    a. *Technical*: Minimal technical challenges, technology is rapidly improving.

    b. *Economic*: Continued escalation of petroleum costs will make PHEV's more desirable.

    c. *Statutory/Regulatory*: Growth of generating facilities.

    d. *Social*: Continued use of the automobile provides minimal social change.

5. Other Factors of Note: PHEV use is projected to climb over decades (2010 to 2050) to reduce dependence on petroleum energy for transportation and to rely more on the energy from the electric grid. During this period, generating facilities with high emissions will either be retrofitted or retired and replaced with lower emitting facilities. Thus, net emissions are projected to be greatly reduced. Additional generating capacity will be needed for U.S. economic growth but currently, upwards of 40% of generating capacity in the U.S. is reduced during the overnight load. Charging of most PHEV's will occur during this off peak period provided appropriate technology is developed to integrate with the grid.

    It is projected that a PHEV sedan could be charged for three or four hours on a 120-V outlet and a commercial delivery van for four or five hours on a 240-V connection. For the typical consumer, this may require an additional outlet in their garage, or on the exterior of their house, or additional outlets where the vehicles are

parked overnight. Use of all fuels and technologies must be analyzed on a full life cycle energy balance to ensure sustainable, verifiable GHG reductions.

6. Level of Group Interest: High to medium. The working group was split between categorizing this action as an essential near term action and a supporting action to undertake in the near-term. The action directly supports other essential actions such as a low carbon fuel standard, feebates, and carbon-based registration fees, and by itself can achieve moderate reductions, but in order to achieve substantial CO_2 reductions from the transportation and land use sector this action must be undertaken in concert with other essential actions.

7. References:

- www.granitestatecleancities.org
- http://www1.eere.energy.gov/cleancities/
- http://dnr.wi.gov/environmentprotect/gtfgw/documents/PHEVExecSumvol1.pdf
- http://mydocs.epri.com/docs/CorporateDocuments/EPRI_Journal/2005-Fall/1012885_PHEV.pdf
- http://www.fueleconomy.gov/feg/fuelcell.shtm

GLA Action 1.6 – Support Strong Climate Action at the Federal Level

Summary:

The Task Force endorses strong national climate legislation to complement state efforts to reduce greenhouse gas emissions and prepare for the projected impacts of climate change. Such action could include increased vehicle fuel economy standards, appliance energy efficiency standards, investment in regional transportation networks and a national cap and trade mechanism. The national legislation should also support for comprehensive adaptation planning that integrates the enhancement of the state's significant existing built and natural infrastructure. In the event that legislation results in a cap and trade program, the national program should return a significant portion of any collected pollution allowance revenues to New Hampshire to fund the emission reduction, clean energy, energy efficiency, and adaptation priorities contained in this Climate Change Action Plan. Adaptation priorities would include protecting natural systems, which provide significant ecosystem services to the state, as well as maintaining and enhancing built infrastructure affected by extreme storm events. Properly structured national climate legislation could provide the needed funding to implement many of the capital-intensive, higher-impact priorities identified in this plan. Funds generated by passage and enactment of a national climate law could drive the large emissions reductions needed while growing the New Hampshire economy if directly returned to the states and properly targeted.

Overall Implementation:

- Pass a legislative resolution to support efforts by the New Hampshire congressional delegation to encourage passage of a national climate bill that would:
  - complement efforts at the state level; and
  - return generated revenue to the states in order to support the implementation of state Climate Change Action Plans.
- State level funding resulting from national legislation should be directed towards:
  - tax credits to support residential and business investment in measures consistent with this Plan;
  - state and local government, NGO, and privately-administered matching grant and loan funds;
  - direct grants or tax rebates to low-income households least able to adjust to potentially higher energy prices and designed to migrate participants as rapidly as possible to greater energy efficiency; and
  - loans and grants for student and worker green jobs training.

Potential Responsible Parties:

- Congressional delegation
- Governor's office and State agencies
- Non-Governmental organizations

Timeframe:

- A legislative resolution could be passed in the 2009 session.
- It is anticipated that a national climate bill will be introduced in Congress in the 2009 Legislative session with passage likely in the next two years. The incoming Obama administration has made a national climate bill one of its top priorities.